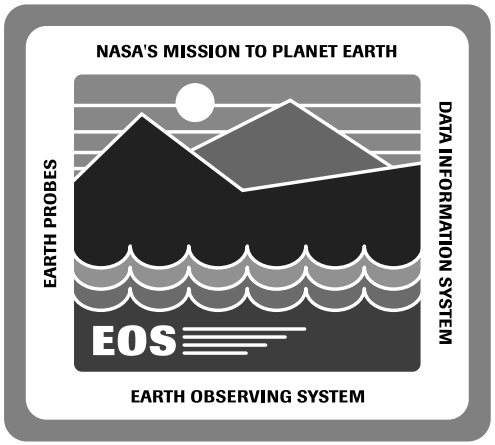
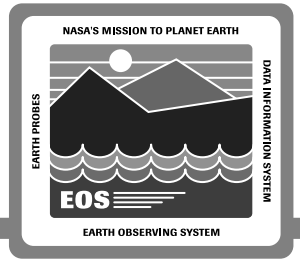


Science Office

Bob Curran

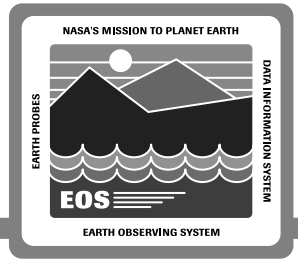
System Design Review - 27 June 1994

Science Community Inputs to ECS Design



What	Who	Results
SCF Characterization Visits	Interdisciplinary Study Teams	Science Drivers Identified
Architecture Working Group	Joint Community/ NASA/ECS Effort	Revised Architecture Developed
Revised System Usage Scenarios	Representative EOS Investigations	Revised System Sizing for Pull
Updated Products List	Algorithm Development Teams	Revised System Sizing for Push

Science Community Inputs to ECS Design



SCF Characterization visits

- **Development of Science Community Mandate**
- **Mandate used as science driver for revised architecture**

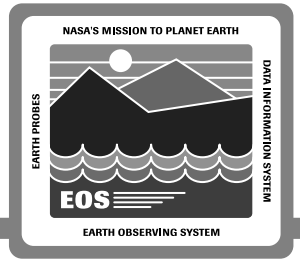
Formation of Architecture Working Group (EOSDIS Panel participation)

- **Revised architecture in System Design Specification**
- **Architecture approach reviewed at SDR**

Revised User Scenarios to better represent system usage

- **Focused on Earth scientists**
- **Separated Push and Pull analyses**
- **Formed basis for Pull sizing**
- **Developed event traces for six User Model/Operations Concepts scenarios**

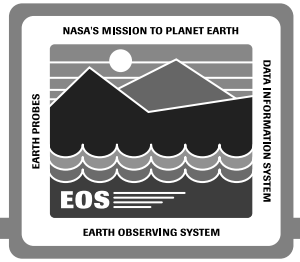
Science Community Inputs to ECS Processing Design



Understanding System Processing Capacity Requirements

- **NASA EOS Project Scientist (M. D. King) - Product Update**
- **NASA SPSO Analysis (Yun-Chi Lu)**
- **ECS follow-up with algorithm teams (TRMM & AM1)**
- **User, data, and system level performance models developed (push capacity requirements)**
- **System design scalable within uncertainties**

Impacts of Community on System Sizing



Push requirements identified and being refined through interactions with algorithms teams

Pull requirements are estimated using surveys, analyses, models; with uncertainty addressed through scalability factors

SDR design can accommodate a wide range of "push" and "pull" capacities

Mandate

EOS science community mandate was drawn from SCF characterization visits. Results of this mandate are traced in the following presentations and the System Design Specification.

Move from ...

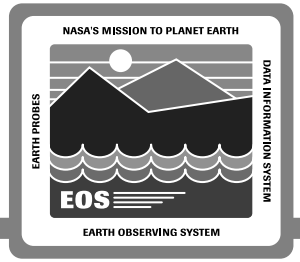
- ø **Product approval and ordering**
- ø **Metadata / data distinction**
- ø **Limited provider implementation**
- ø **Homogenous, centrally managed system components**

Towards ...

- √ **Product publishing and access**
- √ **Seamless view of all data**
- √ **Extended provider implementation**
- √ **Heterogeneous, autonomous system components**

A more evolutionary system

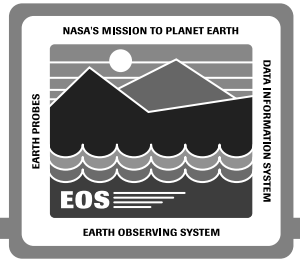
Architectural Approaches Derived from Mandate



Based on Science community mandates develop architectural approaches from architectural concepts.

Architectural Concepts	***Architectural Approaches***
Product publishing and access	Provider services; Direct data access
Seamless view of all data	"Data = services" abstraction; location transparency
Extended provider implementation	Advertising & provider services
Heterogeneous, autonomous system components	Federated data systems; system coordination approach

Mandate Results in System Design Review and Specifications



Subsystems are created from the architectural approach. These are found in the following System Design Specification locations and the corresponding SDPS Sub-System Design Review presentations:

Architectural Approaches	Sub-system	SDS
Provider Services,	Client,	4.5.1
Direct Data Access	Data Server	4.5.4
"Data = services" abstraction;	Interoperability,	4.5.2
location transparency	Data Server	4.5.4
Advertising & Provider Services	Interoperability,	4.5.2
	Data Management	4.5.3
	Data Server	4.5.4
Federated data systems;	Interoperability	4.5.2
system coordination approach	Data Management	4.5.3
	Data Server	4.5.4

Architecture/Design Drivers

System Drivers

Evolvability, s alability,

ners

System Implications

Accommodate new approaches to Earth science research

Incorporate new products, spacecraft, and instruments

Design scalable with changes in processing, storage, and distribution

Incorporate evolving technological advances (e.g. CORBA, OODBMS)

Open, distributed architecture with no fixed assumptions as to the distribution of components and functionality

Provide the interfaces for site unique extensions

ECS On-site User Discussions (Primarily IDS)

Cornell University	B. Isacks, A. Bloom, E. Fielding	6/8/94
Goddard Space Flight Center	R. Rood	10/18/93
	B. Lau	6/3/94
Langley Research Center	B. Wielicki	9/24/93
Monterey Bay Aquuarium Research Institute	P. Brewer, B. Gritton	3/4/94
National Center for Atmospheric Research	P. Rotar, B. Domenico	9/30/93
Oregon State University	M. Abbott, J. Gregor, R. Hogg, J. Rickman L. Walstad,	10/15/93
Pennsylvania State University	E. Barron, D.Miller, T.Carlson	3/24/94
Univeristy of Miami	B. Evans	11/23/93
University of Arizona	R. Dickinson, S.Sorooshian, A. Huete, K. Thome	12/3/93
University of California Santa Barbara	J. Dozier, F. Davis	10/22/93
University of Colorado	B. Emery, D. Baldwin, J. Maslanik	10/1/93
University of New Hampshire	B. Moore, J. Aber, C. Vorosmarty, D. Skole, B. Lemparth	10/12/93 and 6/7/94
University of Virginia	G. D. Emmitt	10/25/93
Woods Hole Oceanographic Institution	D. Glover, S. McCue	12/7/93 and 5/31/94

ECS On-site User Discussions (Scenario Collection)

Cornell University	B. Isacks, K. Haselton, T. Blodgett, C. Duncan, L. Greene, L. Smith, A. Klein, E. Fielding	3/10/94
CEISIN	User Services Working Group Meeting	10/18/93
Eros Data Center	User Services Working Group	11/9/93 and 11/10/93
EPA, Annapolis, MD	J. Hannawald , L. Shuyler	4/18/94
Goddard Space Flight Center	T. Engman, J. Garegnani	2/17/94 and 4/20/94
Langley Research Center	Bruce Barkstrom, V0 tirekickers meeting	10/15/93 12/01/93
National Severe Storms Laboratory, Norman, Oklahoma	Dr. Raul Lopez	3/18/94
Oregon State University	M. Abbott	11/05/93
Pennsylvania State University	E. Barron, D. Miller, J. Leous, M. Lakhtakia, R. White, E. Nizeyimana, D. Lamb, T. Carlson, B. Copehart, R. Gillies	3/4/94
University of California Santa Barbara	J. Dozier	11/04/93
University of Colorado	W. Emery, D. Baldwin	1/19/94 and 1/20/94
University of Hawaii, Honolulu, Hawaii	L. Flynn	3/22/94
University of Virginia	G. D. Emmitt, Cristina Sharretts	10/22/93 and 1/14/94
Woods Hole Oceanographic Institution	D. Glover	6/6/94 and 6/7/94

Additional Science Office Meetings

MODEL DEVELOPMENT VISITS (PRODUCT GENERATION "PUSH")		
ASTER - JPL	M. Pniel, C. Voge, G. Geller	5/19/94
CERES - LaRC	B. Barkstrom, J. Kibler, C. Harris, T. Anselmo	5/5/94
MISER - JPL	S. Lewicki, E. Danielson, B. Vargo, S. Paradise, S. Gluck, E.Hansen, G. Bothwell	5/19/94
MODIS - GSFC	E. Masuoka, V. Solomonson	5/27/94
MOPITT - Landover	J. Drummond, J. Gille, P. Bailey	5/17/94

INSTRUMENT TEAM/USER WORKING GROUP/DAAC MEETINGS	
MODIS Sc ience Team Meeting 9/29 - 10/1/93	AIRS Science Team Meeting 10/12/93
LaRC, B. Wielicki, B. Seals, B. Baum, J. Kibler 9/24/93	NSIDC, P. Rotar 9/30/93
CEISIN User Services WG 11/18/93	IWG 1/11 - 1/13/94
Science Working Group AM Platform (SWAMP) 11/4 -11/93	Third Interuse Workshop 11/16 - 11/17/93
AIRS Science Team Meeting 2/15 - 2/17/94	ASTER Level 1 3/8 -3/9/94
MISR Science Team Meeting 3/30 - 3/31/94	NASA Science Users Network 03/31/94
ASTER Science S/W Review 4/18/94	Hydrologic cycle Data Access & Archive
PODAAC 4/14 -4/15/94	Working Group 4/28 -4/29/94
MODIS Science Team 5/4 -5/6/94	Po.DAG 4/26 -4/28/94
ASTER Joint Science Team 5/23 - 5/27/94	ATDB Reviews 5/9 - 5/11 & 5/16 - 5/17/94
SWAMP 5/18/94	